

*topotype*: ♀, pinned with type. *Paratopotypes*: ♂♀, May 1956; April–May 1959 (P. Susai Nathan).

The most similar regional species is *Toxorhina* (*Toxorhina*) *brevirama* Alexander, readily told by the structure of the male hypopygium, particularly the tergite, vestiture of the basistyle, and the inner dististyle.

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### Three New Species of Trichoptera from Eastern North America

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Although the following caddisflies come from relatively distant localities they appear to share the same ecological requirement of cool, clear, rapid, streams such as are provided in the heart of the temperate deciduous forest. The species of *Sericostoma* finds these conditions in a spring-fed stream some distance from an area which normally has small, clear, cold streams of surface origin.

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Types described in this paper are deposited in the collection of the Illinois Natural History Survey.

#### *Hydropsyche hoffmani* n. sp.

*Male*.—Length 11 mm. Color various shades of light brown; antennae almost straw color with the dorsal dark V-marks conspicuous and contrasting on the six basal segments of the flagellum, fading out on the seventh and eighth segments; wings with a poorly contrasting irregular pattern of various shades of brown. General structure typical for genus. Eyes fairly large, the malar space narrow, the eye occupying almost the entire lateral view of the head, and seen dorsally, each eye as large as the area of the head between the eyes. Genitalia as in Fig. 1. Ninth segment with a pronounced dorsal hump, tenth segment

joined imperceptibly with it. Posterior projections of lateral margin of ninth segment fairly sharp. Tenth tergite with only a slight apical indentation between its lateral lobes, each lobe with a large and irregular lateral wart. Clasper elongate, fairly parallel-sided, the apical segment only indistinctly set off, fairly short, its lateral aspect truncate and incised at the apex to form a sharp point on each side; in posterior view the clasper has the basal segment parallel-sided and gently curved mesad, and the apical segment is triangular, also curved mesad and narrowing to a sharp, pointed tip. Aedeagus obtusely angulate near middle, the apical portion with elongate lateral lobes; the ventral aspect of the apex, Fig. 1B, wider than the more basal portion, the ventral cavity only half the length of the apex and the lateral lobes produced beyond the cavity for a distance about equal to the length of the cavity.

*Holotype male*.—Radford Arsenal, Montgomery County, VIRGINIA, August 4–10, 1956, at light, R. L. Hoffman. *Paratype*.—Same data as for holotype but August 23–29, 1955, 1 male.

This species belongs to the *scalaris* group and within it is most closely related to *leonardi* Ross and *hageni* Banks. In both of these latter species the apical lateral lobes of the aedeagus are produced markedly beyond the mesal cavity as in *hoffmani* but in both *leonardi* and *hageni* the apical segment of the clasper is sinuate and the lateral aspect pointed rather than incised as it is in *hoffmani*. Judged on the basis of the shape of the aedeagus, *hoffmani* and *leonardi* are extremely close; in *hageni* the apex of the aedeagus is produced even more than in these two species. From this it appears probable that *leonardi* is the most primitive member of this complex of three species, and that *hageni* and *hoffmani* represent divergent specializations from almost the same ancestral form.

### *Sericostoma stannardi* n. sp.

*Male*.—Length 11 mm. Color various shades of medium brown, the legs slightly lighter. Maxillary palp with a long sausage-shaped basal segment and a small ovate second segment situated on the inner side of the base of the first segment. Gen-

eral structure otherwise typical for genus. Genitalia as in Fig. 2. Ninth segment ovate laterally, narrow dorsally and ventrally. Tenth tergite elongate, narrow from dorsal or ventral view, the lateral aspect deep at the base and tapering to a pointed apex, the ventral margins at the base curving mesad beneath the aedeagus and forming a channel for this organ. Cercus slender and finger-like. Clasper elongate and complex, consisting of a long, sinuate, lateral lobe (the main body of the clasper) bearing numerous long setae, and a heavily sclerotized mesal structure bearing a curved dorsal process arising at the extreme base (*a*), a shorter mesal branch arising about a quarter of the distance from the base (*b*), and a long slender apical process which is angulate at the tip and which bears a series of minute spurs on its mesal margin (*c*). The bases of the opposed sclerotized processes and the main bodies of the claspers are fused into a strong sclerotized bridge which unites these structures solidly at the base. Aedeagus slender and sinuate, the apex of the sclerotized portion enlarged, a series of membranous folds projecting from the tip.

*Holotype male and 4 paratype males.*—Wall Doxey State Park, 7 mi. S of Holly Springs, MISSISSIPPI, May 21, 1957, Ross and Standard, at light. These specimens were taken along the banks of a small, clear, cold stream, issuing as a spring from sandstone strata in a dense beech forest.

This species is most closely related to *tetron* Ross, from which it differs in having two basal processes instead of one on the sclerotized inner structure of the clasper, and in having the apex of the lateral aspect of the tenth segment narrow and pointed at the extreme tip.

With *tetron*, *distinctum* (Ulmer), *griseum* (Banks), and *crassicornis* (Walker), this species brings to five the number of species in the distinctive North American subgenus *Agarodes* Banks. All the species except *stannardi* occur in the mountainous region of the Southern Appalachians or in boreal areas to the north. This suggests very strongly that *stannardi* may be a relic species existing in spring-fed streams to the south and west of the range of the other species of the genus. In this

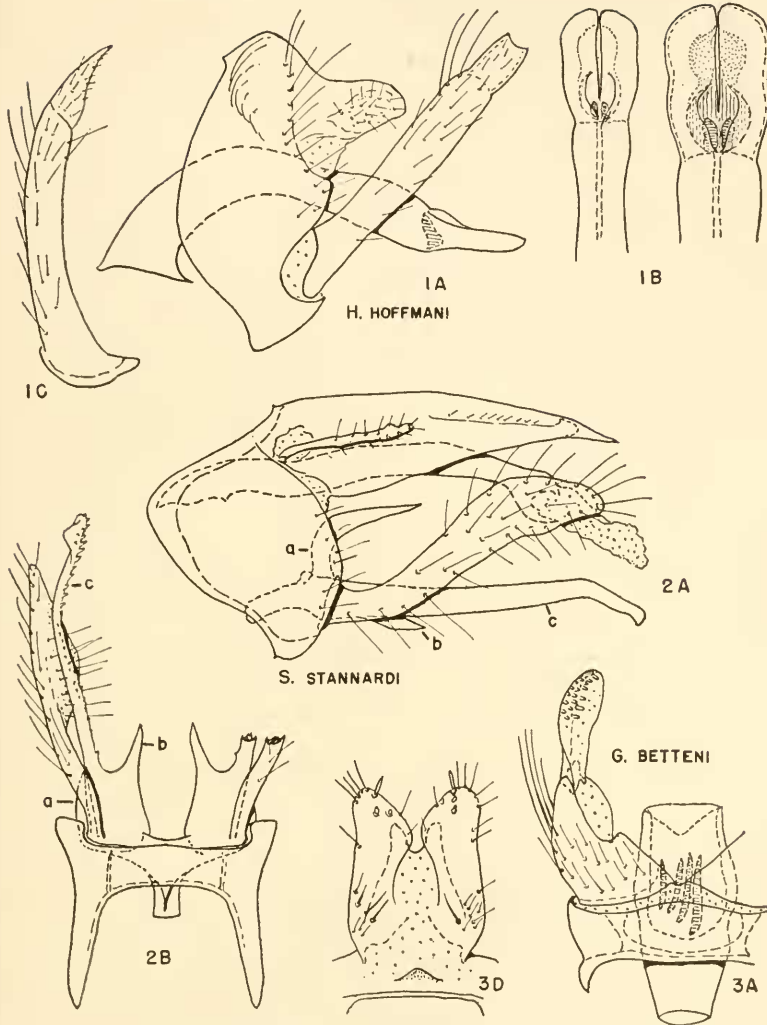
regard, it is interesting that larvae, pupae, and females of a species of *Sericostoma* have been taken in Jackson Parish, Louisiana, in a small spring issuing from sandstone strata. To date, males have not been obtained from the Louisiana locality. However, they should prove most interesting because this locality is a considerable distance south and west of the type locality of *stannardi*.

**Goerita betteni** n. sp.

*Male*.—Length 6 mm. Color light brown, antennae and legs lighter, shading to very pale straw color; dorsum of abdomen darker with blackish suffusions. General structure typical for genus. Eyes without hair. Tibial spurs fairly short, without scaly hair. Genitalia as in Fig. 3. Ninth segment narrow dorsally, with a minute mesal dorsal projection, with lateral lobes projecting anteriorly into the eighth segment, and with a fairly wide ventral expanse. Tenth tergite composed of a pair of clavate lateral lobes situated in a horizontal plane, the two lobes nearly touching on the meson toward their apex, the area between them semi-membranous; beneath these larger dorsal lobes there is a pair of smaller lobes extending to about where the dorsal lobes nearly touch on the meson. Clasper with a broad short basal segment, triangular in ventral view; apical segment clavate but narrow, bearing a dense row of setal pegs on the ventral half of the inner surface. Aedeagus short, wide and ovate in cross section, its apical margin truncate; within the aedeagus is an inverted membranous structure containing four slightly curved dark rods.

*Holotype male*.—Flag Run, Fellowsville, WEST VIRGINIA, June 17, 1958, H. H. and J. A. Ross.

This species differs from *semata* Ross and *genota* Ross, the only other species known in the genus, in having four instead of two rods in the aedeagus, and in the clavate lateral lobes of the tenth tergite. *G. betteni* is probably the species illustrated by Betten (1934, plate 67, figs. 6–11) and considered at that time as an unplaced genus and species which was recorded under the name "Sericostomatid sp." (*ibid.*, p. 413). Dr. Betten had a single specimen taken at West Falls, New York, July 15.



FIGS. 1-3. Male genitalia of Trichoptera. A, lateral aspect; B, ventral aspect; C, posterior aspect of clasper; D, dorsal aspect of tenth tergite. 1B includes two magnifications of the aedeagus. *a, b, c*, homologous branches of the sclerotized inner rod of the clasper.

REFERENCE CITED

BETTEN, CORNELIUS. 1934. The caddis flies or Trichoptera of New York State. N. Y. St. Mus. Bull. 292.